

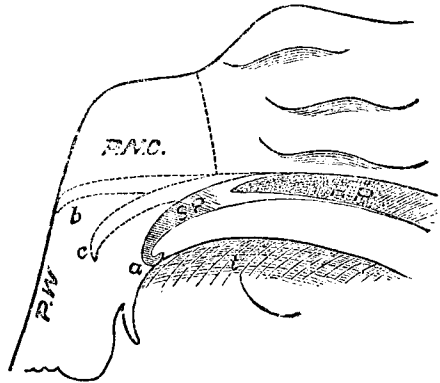
## ARTICLE X.

THE SOFT PALATE AND UVULA AND THEIR FUNCTIONS. BY WHITFIELD WARD, A.M., M.D., Physician to the Metropolitan Throat Hospital.

THE physiological action of the velum pendulum palati is under the especial control of three groups of muscles, viz., the levators, the depressors, and the tensors. The first group comprise the levator palati muscles, the second the palato-pharyngi and palato-glossi, and the third the tensor-palati. During deglutition, when the morsel of food has passed over the epiglottis, the palato-glossi muscles, the constrictors of the fauces, contract behind the food, the soft palate is slightly raised by the levator-palati, and made tense by the tensor-palati, and the palato-pharyngi contract and come near together, the uvula filling up the slight interval between them. During phonation the movements of the soft palate are both remarkable and instructive. In most of the works devoted to laryngology, although great prominence has been given to the physiology of the larynx, scarcely a line has been devoted to that of the palate and its attached uvula. Why this is so, I am unable to state. But this I am confident of, that the velum and uvula play an important part in the production of nearly every tone that issues from the vocal organs, and without their proper action singing is out of the question. The tone-waves which are created by the vibratory action of the vocal cords pursue three different courses in their journey from the body, viz., through the mouth, through the nose, and through the mouth and nose combined. The direction which each wave takes depends entirely upon its position in the voice-register. In some cases the majority if not all of the positions assumed by the velum can be observed without the help of the tongue-depressor, whilst in others, especially where the tongue is thick or unruly, this instrument is indispensable. During the production of tones that are emitted through the nose alone, the free border of the velum, throughout its entire extent, rests upon the dorsum of the tongue, thus shutting off all communication between the fauces and anterior buccal cavity, and creating, as it were, two distinct compartments. This valve-like action of the soft palate is a very important one; for, by so doing, the length of the human musical pipe is increased. If, during the intonation of certain notes, the pendulous velum should be pressed up against the pharynx, exactly the same effect would be produced as though a piece of the upper extremity of an organ-pipe were to be cut off, namely, the placing of the note higher in the scale. The posterior pillars of the fauces play a most important part in the formation of this, what might be called, "annex" vocal tube; since by the contraction and relaxation of the muscles forming these columns, the diameters of the above-described cavity are made to increase and diminish, in order to

exactly conform to the varying dimensions which the larynx assumes during the production of certain tones.

During the intonation of sounds that pass through the mouth alone, the free border of the velum is pressed tightly against the upper surface of the pharynx, thus cutting off all communication between the mouth and posterior nasal cavities; the human musical instrument is thus materially shortened. In the production of these tones the roof of the mouth, made up of hard and soft palate, acts the part of a complete sounding-board, increasing the timbre of the voice, and greatly adding to its beauty. During the singing of tones that issue in the same degree from both nose and mouth, the velum is poised in the posterior part of the buccal cavity, at an equal distance from the posterior wall of the pharynx and base of the tongue. Let us examine a vocalist during the singing of the scale with the full chest register. At the intonation of the lowest note, the velum rests throughout its whole free edge on the base of the tongue, and there is no communication between the cavity immediately beyond this pendulous body and that in front of it. As the performer ascends in the scale, the velum lifts itself from the tongue, at first forming two semicircular openings on either side of the uvula. When a middle note of the register is arrived at, the valve-like palate is suspended in the mouth at an equal distance from the pharynx and tongue. As soon as the higher tones are reached, the body is approximated to and touches the posterior wall of the pharynx, at first only in three places, viz., at the site of the uvula, and at either extremity, thus forming, as in the case of some of the lower notes, two semicircular openings. When the highest note of the register is sounded, the pendulous velum is drawn tightly up against the pharyngeal wall, and no communication whatsoever is allowed to exist between the buccal and posterior nasal cavities. The subjoined cut will serve to illustrate the three different positions assumed by the soft palate, as described above. *a*, representing its location during the production of tones that issue through the nose alone. *b*, the location of the velum during the production of tones that issue through the mouth alone; and *c*, its location during the production of tones that issue in the same degree from both nose and mouth.



The truth of these assertions can be easily demonstrated by any person possessing slight vocal abilities. All that is necessary to do is to com-

press the anterior nares so as to preclude the possibility of air escaping therefrom, and produce the tones above described. Those that proceed entirely through the mouth will, of course, be unaffected by such pressure, while those emitted through the nose alone will be entirely gone, or greatly muffled.

The physiology of the uvula is none the less remarkable, since very many of the actions of the velum are entirely under the control of this important little body. The uvula is the supporter of the soft palate. In order that the velum pendulum palati shall perform its functions in a normal manner, it must be kept from vibrating. If perchance this body should vibrate during intonation, a sort of tremulousness would be imparted to the voice, and the whole beauty of the singing be utterly destroyed, or seriously compromised. In order to examine fully the movements of the uvula, it is necessary to resort to rhinoscopy. Those cases in whom the interval between the soft palate and pharyngeal wall is marked afford the best advantages for examination. Presuming that the uvula is of the normal size, let us examine one of these cases during singing, and tabulate the result. While the free border of the palate is resting on the base of the tongue the uvula lies dormant on the surface of the same organ; but as soon as the velum elevates itself the uvula begins to act, rising up from the tongue, where, in the first instance, it was extended for its full length, in proportion as the velum recedes from the latter body. When the pendulous palate has reached a certain point in its journey upwards the uvula is depressed to its fullest extent, touching the tongue only at its tip end. Generally speaking, the point of suspension above alluded to is midway between the pharynx and the tongue, normally poised. At this time the tongue begins to take an active part in the above movements, for when the tip of the uvula just touches the dorsum of the tongue, this latter organ begins to elevate itself at the base, assuming gradually a more and more convex position as the velum ascends. This action on the part of the lingual organ, is for the purpose of continuing its support to the velum. The degree of convexity, which is reached by the tongue, is regulated by the distance at which the soft palate is placed from the pharyngeal wall. As soon as the tongue ceases to rise, and thereby fails to afford support to the velum, the azygos uvulæ muscles begin to contract, and the uvula is seen to be speedily drawn upwards. When these muscles begin to contract there appears on the posterior surface of the soft palate a slight prominence, which in its inception is scarcely noticeable. Upon carefully inspecting the posterior nares, with the valuable assistance of the rhinoscope, during the workings of the azygos uvulæ muscles, it is seen that the prominence just alluded to increases or diminishes in size, according as the uvula is drawn up or relaxed. What then is the function of this which has been aptly termed the azygos prominence? It is akin to that of the uvula itself, furnishing support to the soft palate when the

uvula fails to perform this important duty. Were it not for this action, as soon as the apex of the uvula became separated from the base of the tongue the velum would be free to vibrate at will, and the singing voice be seriously affected. Before concluding, I would say one word regarding the amputation of the uvula. In order that the uvula shall perform its function of supporting the velum properly, its dimensions must be normal. It is impossible to set down any standard length by which the surgeon can be guided. The only safe rule which can be employed, is to gently depress the tongue and measure the distance from its base to the quiescent velum. The tip end of the normal uvula will just touch the lingual organ during the above manipulation. What will be the effect of an elongated uvula upon the velum pendulum palati? It will seriously compromise its action. The maximum amount of interference will be manifested during the production of tones that pass entirely through the mouth, and the minimum amount during the rendition of sounds that pass entirely through the nasal passages. In the first instance the voice will be interfered with in two distinct ways: 1st. The complete approximation of the palate to the pharyngeal wall will be prevented on account of the additional weight which the elongated body imposes upon the velum. 2d. The *azygus uvulae* muscles will be unable to draw up the entire uvula, hence there will be a relaxed body of varying size directly in the line of the emitted tone. When the tone passes through the nasal passages only the entire uvula rests on the tongue, and is not apt to offer any obstruction. An elongated uvula must interfere with tones that pass partly through the nose and partly through the mouth, not only by offering an obstruction to the egress, but also by bearing down on the velum, which latter act will suffer more air to be transmitted through the nose than is required. Very many practitioners make a grievous error when performing this operation, in that they excise too great an amount of this important little organ. This is a grand mistake, and one that is almost certain to harm the singing voice. If the uvula is wanting, the velum will lose its support in the rendition of nearly one-half the vocal register, hence the currents of air, as they pass from the body, will set this valvelike body into vibration, which will cause a certain degree of tremulousness to be imparted to the voice. I have seen several instances in which the excision of the entire uvula has been followed by the above phenomena. As soon as the surgeon becomes aware that this conical-shape body, which is generally considered as useless, has an important function to perform within the human organism, such cases will be extremely rare.

339 WEST TWENTY-THIRD STREET, N. Y. CITY.